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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 09/767,919   | 01/24/2001  | Yun Chur Chung       | EM/LEE/6474         | 2862             |
| 7590   | 11/06/2002  |                      | EXAMINER            |                  |
| BACON & THOMAS, PLLC<br>4th Floor<br>625 Slaters Lane<br>Alexandria, VA 22314-1176 |             |                      | STOCK JR, GORDON J  |                  |
|  |             | ART UNIT             | PAPER NUMBER        |                  |
|  |             | 2877                 |                     |                  |

DATE MAILED: 11/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                 |              |
|------------------------------|-----------------|--------------|
| <b>Office Action Summary</b> | Application No. | Applicant(s) |
|                              | 09/767,919      | CHUNG ET AL. |
|                              | Examiner        | Art Unit     |
|                              | Gordon J Stock  | 2877         |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on \_\_\_\_.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-5 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_ is/are allowed.  
 6) Claim(s) 1-5 is/are rejected.  
 7) Claim(s) \_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 24 January 2001 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 11) The proposed drawing correction filed on \_\_\_\_ is: a) approved b) disapproved by the Examiner.  
 If approved, corrected drawings are required in reply to this Office action.  
 12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
 \* See the attached detailed Office action for a list of the certified copies not received.  
 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
 a) The translation of the foreign language provisional application has been received.  
 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) Notice of References Cited (PTO-892)                    4) Interview Summary (PTO-413) Paper No(s). \_\_\_\_.  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)                    5) Notice of Informal Patent Application (PTO-152)  
 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_                    6) Other: \_\_\_\_

## DETAILED ACTION

### *Specification*

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Objections*

2. **Claims 4 and 5** are objected to for the following: the phrase, 'adapted to,' in lines 11, 16, 21, and 24 of **claim 4** and line 7 of **claim 5** is indefinite, for it is unclear as to how the elements of the apparatus are adapted to perform the particular claimed function.

Clarification is required.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claim 1** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Aspell et al. (5,223,705)** in view of **Khaleghi et al. (6,040,933)** and further in view of **Mori et al. (5,917,649)**.

As to **claim 1**, Aspell discloses a method for monitoring an optical amplifier using a polarization-nulling method, comprising the steps of:

a) linearly polarizing an arbitrarily polarized optical signal including an unpolarized ASE noise (col. 2, lines 15-45; col. 3, lines 5-40);

b) separating the optical signal and the ASE noise from the linearly polarized optical signal including the unpolarized ASE noise to measure a power of the optical signal and a power of the ASE noise included in a bandwidth of an optical signal (col. 3, lines 25-67; col. 4, lines 1-35)

c) obtaining the noise figure using the measured optical signal power and ASE noise power (col. 3, lines 47-67; col. 4, lines 1-35).

Aspell is silent concerning obtaining the optical signal to noise ratio; however, it is well known in the art that the optical signal to noise ratio is a measure of performance from the teaching of Khaleghi (col. 1, lines 30-31) and that the OSNR is a function of noise figure (col. 4, equation 1). In addition, Mori teaches that noise figure is derived from the signal to noise of the optical amplifier (col. 2, lines 1-67; col. 3, lines 1-40). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to obtain the OSNR in order to obtain the performance of the optical amplifier. Also it would have been obvious to one skilled in the art the time the invention was made that the optical signal to noise ratio is obtained for the noise figure is derived from the optical signal to noise ratio.

5. **Claims 2 and 3** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Aspell et al. (5,223,705)** in view of **Khaleghi et al. (6,040,933)** and further in view of **Mori et al. (5,917,649)** and further in view of **Shieh (6,384,956)**.

As to **claim 2**, Aspell in view of Khaleghi and Mori disclose everything as above (see **claim 1**). However, Aspell is silent concerning allowing the optical signal including the unpolarized ASE noise to pass through a rotating quarter-wave plate. Aspell does disclose a polarization controller; whereas, the optical signal passes (col. 3, lines 24-40; Fig. 1, **60**). Shieh

discloses that is well known in the art to have the polarization controller comprise a quarter-wave plate (col. 1, lines 30-50) and discloses a polarization controller comprising a plurality of quarter wave plates in order to have a fixed and known polarization of the output optical signal maintained (col. 2, lines 18-28). It would have been obvious to one skilled in the art at the time the invention was made to have the polarization controller comprise a rotating quarter wave plate in order to have the polarization of the output optical signal maintained.

As to **claims 3/1 and 3/2**, Aspell in view of Khaleghi and Mori disclose everything as above (see **claims 1 and 2**). In addition, Aspell discloses allowing the linearly polarized optical signal including the unpolarized ASE noise to pass through a rotatable linear polarizer; measuring a minimum power and a maximum power of the signal outputted from the rotatable linear polarizer; and measuring the power of the optical signal and power of the ASE noise included in the bandwidth of the optical signal from the measured minimum power and maximum power of the signal outputted from the rotatable linear polarizer (col. 3, lines 23-67; col. 4, lines 1-35). Aspell is silent concerning the linearly polarized optical signal passing through a rotating linear polarizer; however, Aspell discloses a polarization controller (col. 3, lines 24-40; Fig. 1, **60**). Shieh discloses a polarization controller comprising a plurality of rotating quarter wave plates (Figs. 1 and 2) to have the polarization of the output optical signal maintained (col. 2, lines 18-28). It is well known in the art that a quarter wave plate linearly polarizes circularly polarized light and circularly polarizes linearly polarized light. Therefore, in order to have linearly polarized light, the last quarter wave plate of the polarization controller from which the optical signal passes is a rotating linear polarizer for the signal exiting is linearly polarized. Therefore, it would be obvious to one skilled in the art to have the polarization

controller comprise a rotating linear polarizer in order to maintain linear polarization of the optical signal.

6. **Claims 4-5** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Aspell et al. (5,223,705)** in view of **Shieh (6,384,956)** and further in view of **Khaleghi et al. (6,040,933)** and further in view of **Mori et al. (5,917,649)**.

As to **claim 4**, Aspell discloses an apparatus for measuring an optical amplifier parameter with polarization comprising: a measuring means for measuring a minimum and maximum power of the outputted signal (col. 3, lines 40-67; col. 4, lines 1-35); a calculating means to measure a power of the optical signal and a power of the ASE noise according to the measured minimum power and maximum power of the signal inputted (col. 3, lines 40-67; col. 4, lines 1-35); a polarization controller and a polarizer (Fig. 1, **60** and **54**). Aspell is silent concerning a rotating quarter-wave plate and a rotating linear polarizer; however, Aspell does disclose a polarization controller; whereas, the optical signal passes (col. 3, lines 24-40; Fig. 1, **60**). Shieh discloses that it is well known in the art to have the polarization controller comprise a quarter-wave plate (col. 1, lines 30-50) and discloses a polarization controller comprising a plurality of quarter wave plates in order to have a fixed and known polarization of the output optical signal maintained (col. 2, lines 18-28). Shieh discloses a polarization controller comprising a plurality of rotating quarter wave plates (Figs. 1 and 2) to have the polarization of the output optical signal maintained (col. 2, lines 18-28). It is well known in the art that a quarter wave plate linearly polarizes circularly polarized light and circularly polarizes linearly polarized light. Therefore, in order to have linearly polarized light, the last quarter wave plate of the polarization controller from which the optical signal passes is a rotating linear polarizer for the signal exiting is linearly

polarized. Therefore, it would be obvious to one skilled in the art to have the polarization controller comprise a plurality of rotating quarter wave plates, whereas, the last one that the optical signal passes is a rotating linear polarizer, in order to maintain linear polarization of the optical signal.

Aspell in view of Shieh does not disclose the rotating quarter-wave plate polarizing the signal more than four times during the 360 degree rotation. However, this property is an inherent property of a rotating quarter-wave plate as disclosed in the Applicant's specification (page 9, lines 10-15).

Aspell in view of Shieh discloses the power varying through adjustment of the polarization controller (col. 3, lines 25-65). Shieh discloses the power of the signal varying with angle (col. 3, lines 25-55). Therefore, it would have been obvious to one skilled in the art that the adjusting of the polarization controller to change the output power is due the angular adjustment of the polarization controller, for the output signal strength is dependent on the angular position of the wave plates.

Aspell is silent concerning the calculation of the optical signal to noise ratio; however, it is well known in the art that the optical signal to noise ratio is a measure of performance from the teaching of Khaleghi (col. 1, lines 30-31) and that the OSNR is a function of noise figure (col. 4, equation 1). In addition, Mori teaches that noise figure is derived from the signal to noise of the optical amplifier (col. 2, lines 1-67; col. 3, lines 1-40). Therefore, it would have been obvious to one skilled in the art at the time the invention was made that the OSNR would be calculated in order to obtain the performance of the optical amplifier. Also it would have been obvious to one

skilled in the art the time the invention was made that the optical signal to noise ratio is calculated for the noise figure is derived from the optical signal to noise ratio.

As to **claim 5**, Aspell in view of Shieh and further in view of Khaleghi and Mori disclose everything as above (see **claim 4**). In addition, Aspell discloses a photodetector and a microprocessor to obtain the OSNR (col. 3, lines 35-45).

***Fax/Telephone Numbers***

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement “DRAFT” or “PROPOSED AMENDMENT” on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

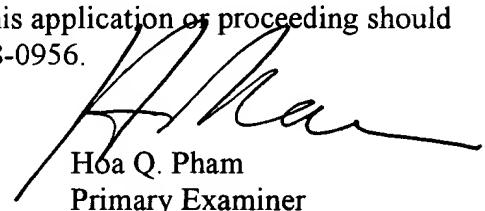
*Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is:*

**(703) 308-7722**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (703) 305-4787. The examiner can normally be reached on Monday-Friday, 10:00 a.m. – 6:30 p.m.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ps  
gs  
October 22, 2002



Hoa Q. Pham  
Primary Examiner  
Art Unit 2877